

Work Order ID 50696

July 21, 2009 10:01:20 AM



Page 1

Item ID: D212-664-107TRN

Accept



Setup Start



Revision ID: A

Stop



Item Name: Crosstube Turning Detail

Start Date: 07/21/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: *mf*

Date: *09-07-21*

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Draw Number | Draw Rev. | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|

| Draw Nbr | Revision Nbr |
|--------------|--------------|
| D212-664-147 | Rev A |

100

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

mf 09/07/28

1 0

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA705112-Turn first side as per Folio FA113113-File down transition lines smooth.

110

0.00



QC1- Inspect dimensions to dimension sheet

QC

Memo

0.00

mf 09/07/29

1 0

Quality Control

120

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

mf 09/07/29

1 0

Mori Seiki CNC Lathe Large

1-Turn second side as per Folio FA705112-File down transition lines smooth.
2-
3- Remove plugs and sand

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
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NOTE: Date & initial all entries

Work Order ID 50696

July 21, 2009 10:01:20 AM

Page 2

Item ID: D212-664-107TRN

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Revision ID: A

Item Name: Crosstube Turning Detail

Start Date: 07/21/2009 Start Qty: 1.00

Required Date: 07/31/2009 Req'd Qty: 1.00

Reference:

Cust Item ID:

Customer:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

QC1- Inspect dimensions to dimension sheet

0.00



QC

Memo

0.00

Quality Control

ent 09/07/29

1 0

140

QC8- Inspect parts - second check

0.00



QC

Memo

0.00

Quality Control

1 0 - AWM 9-7-30

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

1 0 - AWM 9-7-30

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
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| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
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NOTE: Date & initial all entries

Work Order ID 50696

July 21, 2009 10:01:20 AM

Page 3

Item ID: D212-664-107TRN

Accept

Revision ID: A

Item Name: Crosstube Turning Detail

Start Date: 07/21/2009 Start Qty: 1.00

Required Date: 07/31/2009 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: Date: Tooling: Date: QC: Date: SPC (Y/N): Date:

Run Start

Stop

Sequence ID/ Work Center ID Operation Description Set Up/ Run Hours Draw Number Draw Rev. Plan Code Accept Qty Reject Qty Reject Number Insp. Stamp

160 QC3- Inspect Part Finish 0.00

QC Memo 0.00

Quality Control

170 Packaging 0.00

Packaging Memo 0.00

Packaging Identify and stock in kanban rack Location: X-TUBE CELL

180 QC21- Final Inspection - Work Order Release 0.00

QC Memo 0.00

Quality Control

Parent Item: D212-664-107TRNRevA

Parent Item Name: Crosstube Turning Detail

Start Date: 07/21/2009

Required Date: 07/31/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

| Component Item ID/ Item Name | Replacement Item ID | Mfg/ Purch | Bin Item | Primary Location | Last Location | Route Seq ID | Unit of Measure | Qty on Hand | Remaining Qty To Pick | Qty Issued | Date Issued | Status |
|------------------------------|---------------------|--------------|----------|------------------|---------------|--------------|-----------------|-------------|-----------------------|------------|-------------|--------|
| D6019-128RevA | | Manufactured | No | | | 110 | Each | 22.0000 | 1.0000 | | | |
| Crosstube Material | | | | | | | | | | | | |

Warehouse Location Main Warehouse LG 29369 32310 Loc Qty 22 7 15 Loc Code 29369

1 mld 09/07/28

| | | | | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|--|
| W/O: | | WORK ORDER CHANGES | | | | | | |
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector | |
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|--|
| W/O: | | WORK ORDER CHANGES | | | | | | |
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector | |
| | | | | | | | | |
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| | | | | | | | | |
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| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
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NOTE: Date & initial all entries

| | | |
|--|--|----------------------------------|
| DART AEROSPACE LTD | | Work Order: 50696 |
| Description: Crosstube Assembly (205/212/412 Low Fwd) | | Part Number: D212-664-147 |
| Inspection Dwg: D212-664-147 Rev: A | | Page 1 of 1 |

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

| Inspection Sheet | Drawing Dimension | Tolerance | Actual Dimension | Accept | Reject | Method of Inspection | Comments |
|------------------|-------------------|---------------|------------------|--------|--------|----------------------|------------|
| SIDE A | 0.313 | +/-0.010 | 0.305 | ✓ | | | |
| | 2.360 | +0.005/-0.000 | 2.363 | ✓ | | | |
| | 2.360 | +0.005/-0.000 | 2.365 | ✓ | | | |
| | 2.366 | +0.005/-0.000 | 2.371 | ✓ | | | |
| | 2.473 | +0.005/-0.000 | 2.478 | ✓ | | | |
| | 2.573 | +0.005/-0.000 | 2.574 | ✓ | | | |
| | 2.673 | +0.005/-0.000 | 2.677 | ✓ | | | |
| | 2.750 | +0.005/-0.000 | 2.748 | | ✓ | | matl stock |
| | 2.750 | +0.005/-0.000 | 2.749 | | ✓ | | matl stock |
| | | | | | | | |
| SIDE B | 0.313 | +/-0.010 | 0.310 | ✓ | | | |
| | 2.360 | +0.005/-0.000 | 2.363 | ✓ | | | |
| | 2.360 | +0.005/-0.000 | 2.365 | ✓ | | | |
| | 2.366 | +0.005/-0.000 | 2.371 | ✓ | | | |
| | 2.473 | +0.005/-0.000 | 2.478 | ✓ | | | |
| | 2.573 | +0.005/-0.000 | 2.574 | ✓ | | | |
| | 2.673 | +0.005/-0.000 | 2.677 | ✓ | | | |
| | 2.750 | +0.005/-0.000 | 2.748 | | ✓ | | matl stock |
| | 2.750 | +0.005/-0.000 | 2.748 | | ✓ | | matl stock |
| | | | 2.500 | ✓ | | | |
| | 0.126.53 | +/-0.020 | 126.550 | ✓ | | | |

| | | | |
|-------------------------------|-------------------------------|----------------------------|-----|
| Measured by: <i>ml</i> | Audited by: <i>ANM</i> | Prototype Approval: | N/A |
| Date: 09/07/29 | Date: 9-7-30 | Date: | N/A |

| | | | | |
|------------|-------------|------------------------------|-------------------|-----------------|
| Rev | Date | Change | Revised by | Approved |
| A | 08.11.07 | New Issue (P/O D212-664-107) | KJ/EC <i>AK</i> | <i>AK</i> |

PARTS LIST:

| Qty | Part Number | Description |
|-----|-------------------|---|
| X | D212-664-147 | CROSSTUBE ASSEMBLY (205/212/412 LOW FWD) |
| 1 | D6019-128 | CROSSTUBE |
| 2 | D2893-1 | SUPPORT |
| 4 | D3595-063-450 | RUBBER CUSHION |
| 2 | D3659-1 | CUFF |
| 4 | MS21920-25 | CLAMP (OR MS21920-26) |
| 44 | CR3212-4-06 | RIVET (OR M7885/3-4-06) |
| A/R | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE) |
| A/R | SIKAFLEX-241/-291 | SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT) |

GENERAL NOTES:

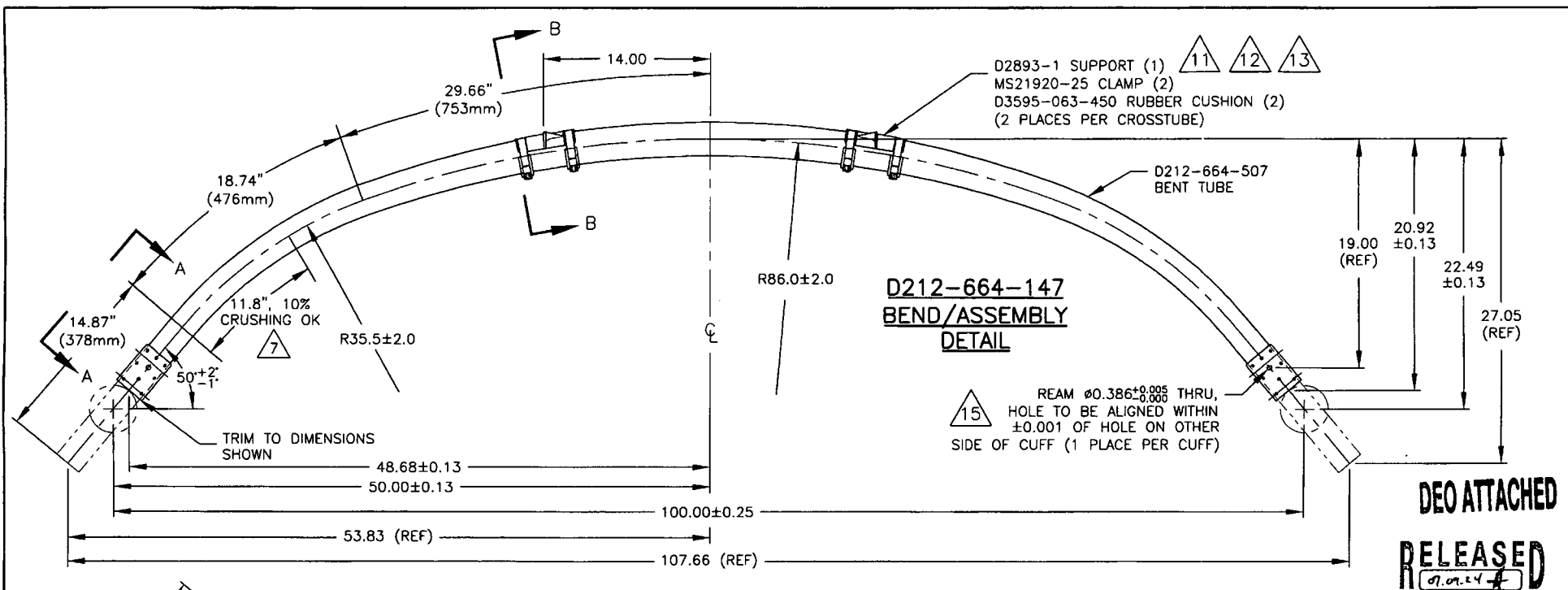
- 1) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.53±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) ALL DIMENSIONS ARE IN INCHES
- 5) PART IS SYMMETRIC ABOUT CENTERLINE.
- 6) WHEN MACHINING TAPER, RUN-OFF PART AT STOCK. BLEND OUT EDGE LONGITUDINALLY,
TRANSITION SHOULD BE SMOOTH.
- 7) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE
TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 8) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 9) SCRIBE DART PART NUMBER AND BATCH NUMBER ON INNER SURFACE OF TUBE WITH A
VIBRATING STYLUS.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1
THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE
D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE
CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY
AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A
LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN
CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

50696
MLF 09-07-21

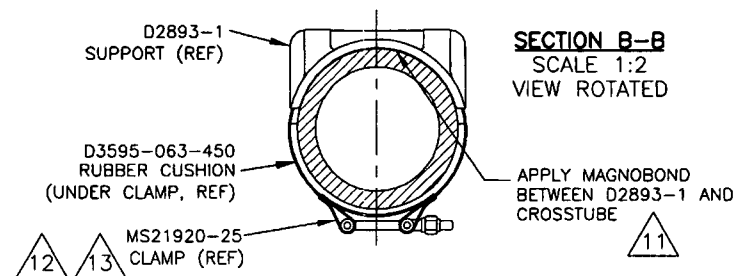
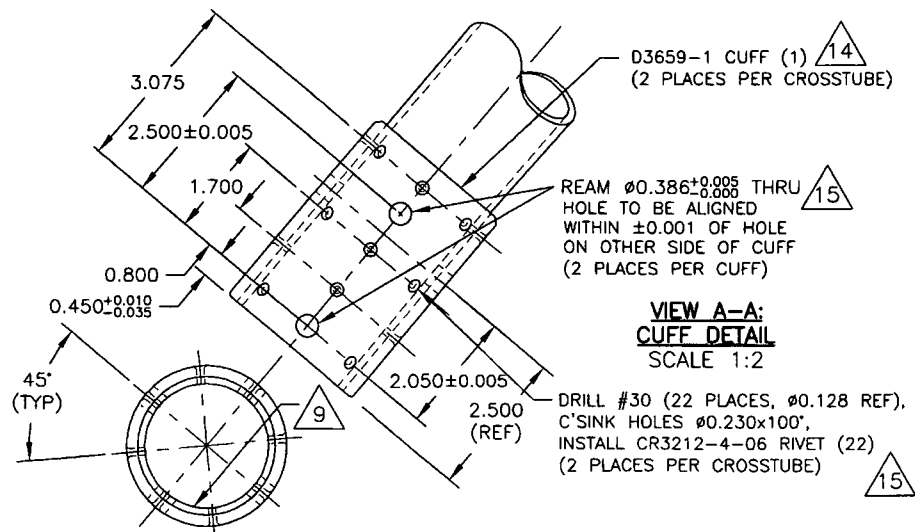
DEO ATTACHED

RELEASED
07.09.24

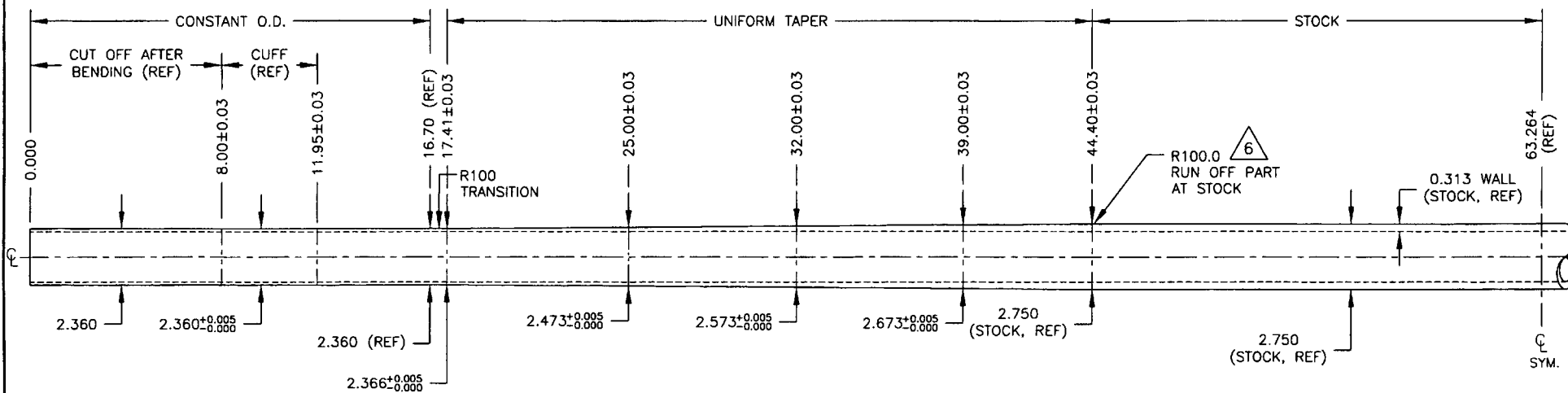
| | | |
|---|----------|---|
| A | 07.07.07 | NEW ISSUE |
| DESIGN | qj | DART DART AEROSPACE LTD. MANNESBURY, ONTARIO, CANADA |
| CHECKED | qj | DRAWING NO. REV. A |
| DATE | 07.07.07 | D212-664-147 SHEET 1 OF 3 |
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| CROSSTUBE (205/212/412 LOW FWD) NTS | | |



50696



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|--|--|---------|----------|----------|----|---------------------------------|--|
| COPYRIGHT © 2007 BY DART AEROSPACE LTD. | | DESIGN | 90 | DRAWN BY | 90 | DART | DART AEROSPACE LTD. HARRISBURG, ONTARIO, CANADA |
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| | | DATE | 07.07.07 | TITLE | | CROSSTUBE (205/212/412 LOW FWD) | SCALE 1:8 |



D212-664-147 MACHINING DETAIL

RELEASED
07.07.24

DEO ATTACHED

50696

| | | | | | |
|--|--|--|--------------------|-----------------------------|--|
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| DATE 07.07.07 | | TITLE CROSSTUBE (205/212/412 LOW FWD) | | SCALE 1:4 | |

| | | | | | | | |
|-----------------------------|----------------------|------------------------|---|--|--------------------------------|---------------------------|--------------|
| DRAWING NO. D212-664-147 | TITLE CROSSTUBE | REV. A | DART AEROSPACE LTD ENGINEERING ORDER | | D.E.O. NO. D212-664-147-A-1 | SHEET NO. SHEET 1 OF 1 | SCALE NTS |
| DRAWN <i>CP</i> | CHECKED <i>PA</i> | MFG. APPR. <i>E</i> | APPROVED <i>MD</i> | | DE APPR. <i>SH</i> | | |
| DATE 09.05.01 | DATE 09.06.15 | DATE 09.06.15 | DATE 09/06/16 | | DATE 09/06/16 | | |

CHANGE:

ADD THE FOLLOWING CROSSTUBE ASSEMBLY:

| Part Number | Description |
|---------------|----------------------------------|
| D212-664-147B | CROSSTUBE ASSEMBLY (214 LOW FWD) |

THE D212-664-147B CROSSTUBE HAS THE SAME PARTS LIST AS THE D212-664-147 CROSSTUBE. HOWEVER, INSTALL THE SUPPORTS AS SHOWN IN FIGURE 1 OF THIS ENGINEERING ORDER. THE NEW KIT IS OTHERWISE ASSEMBLED PER THE D212-664-147 CROSSTUBE.

RELEASED
09/06/22 *MD*

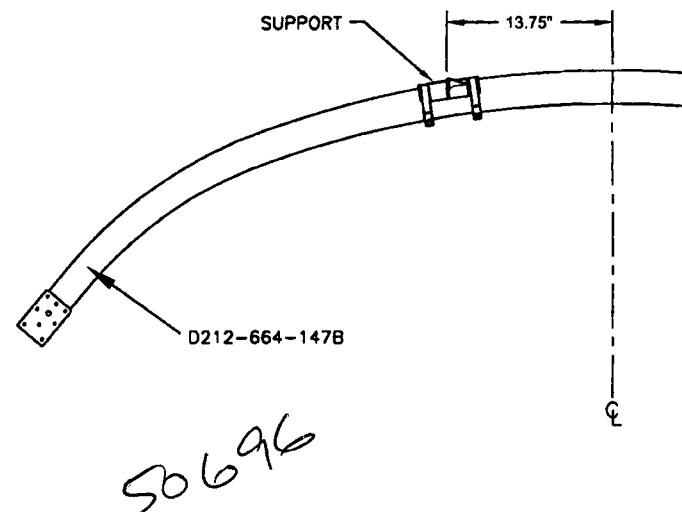


FIGURE 1 - SUPPORT INSTALLATION